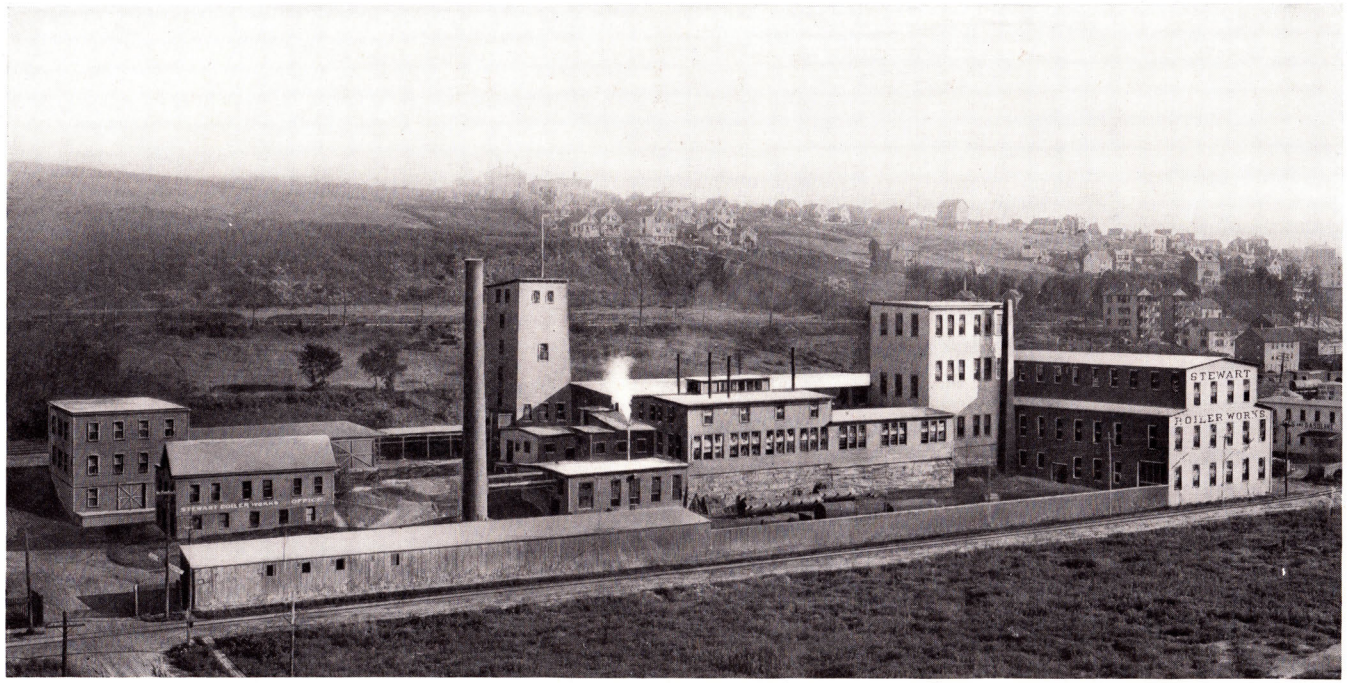
CATALOGUE *of*

HORIZONTAL TUBULAR ·BOILERS·

STEWART BOILER WORKS
WORCESTER, MASS.
1919



VIEW OF OUR WORKS FROM THE NORTH

CORNER OF ALBANY AND MUSKEEGO STREETS AT THE LEFT. THE TWO TALL STRUCTURES ARE THE RIVETING MACHINE TOWERS

STEWART BOILER WORKS

ESTABLISHED 1865

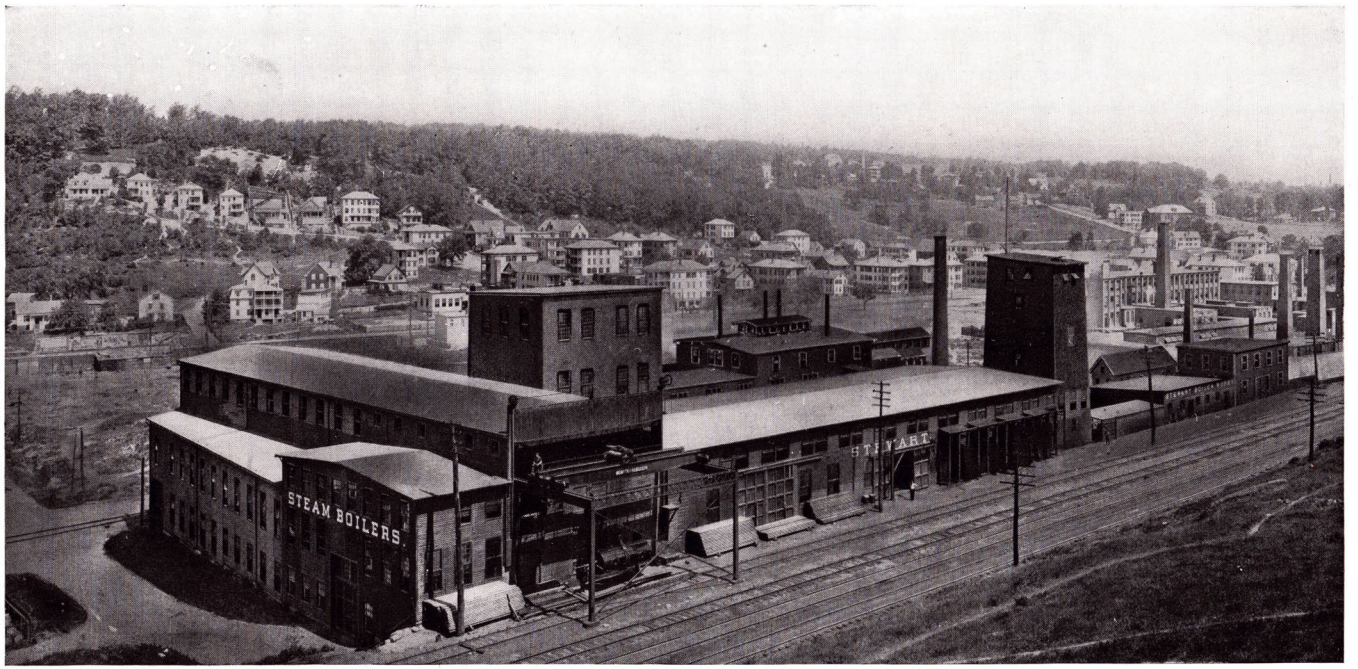
Manufacturers of

HIGH PRESSURE STEAM BOILERS

STEEL TANKS FOR ALL PURPOSES, SMOKE STACKS, PENSTOCKS,
DISINFECTING APPARATUS, VULCANIZERS, AND PLATE
IRON WORK OF EVERY DESCRIPTION

Catalogue 4

WORCESTER, MASSACHUSETTS, U. S. A.
1919



VIEW OF OUR WORKS FROM THE BOSTON & ALBANY R. R. (SOUTH)

SHOWING ELECTRIC TRAVELLING CRANE LOADING ON CAR. TWO TALL STRUCTURES ARE TOWERS FOR RIVETING MACHINES
CORNER OF ALBANY AND CASCO STREETS AT THE LEFT

Established 1865

WE desire to present to your attention our facilities for the manufacture of several types of STEAM BOILERS for high and low pressure work; OIL, WATER, DYE, BLEACHING AND STEAM TANKS, PENSTOCKS, SMOKE STACKS, and all kinds of heavy and light PLATE-IRON WORK.

We are prepared to estimate upon the above, at fair prices, for first-class work, and if desired, will make proposal for the same, delivered on your premises, and erected complete.

Being situated on the line of the Boston & Albany Railroad, one-half mile east of the Union Station, we have the benefit of a spur track and use an electric travelling crane in loading and unloading heavy material, thus reducing to a certain extent the cost of production.

All of our machinery is of modern design, and some machines are the heaviest and largest made.

Our patterns conform to the latest designs and best modern practice.

We give personal attention to the manufacture and the erection of the work, and aim to satisfy our customers in the quality of the material and workmanship.

Special attention paid to Repairs, and Setting of Boilers; to remedy defective drafts and save fuel.

Having had a long and practical experience in this City and vicinity, we are pleased to state we can make reference to all steam-users.

Should you wish an estimate at the present, or future time, upon any kind of work in our line, we hope to be favored with your inquiry, and will endeavor to merit your orders.

Respectfully submitted,

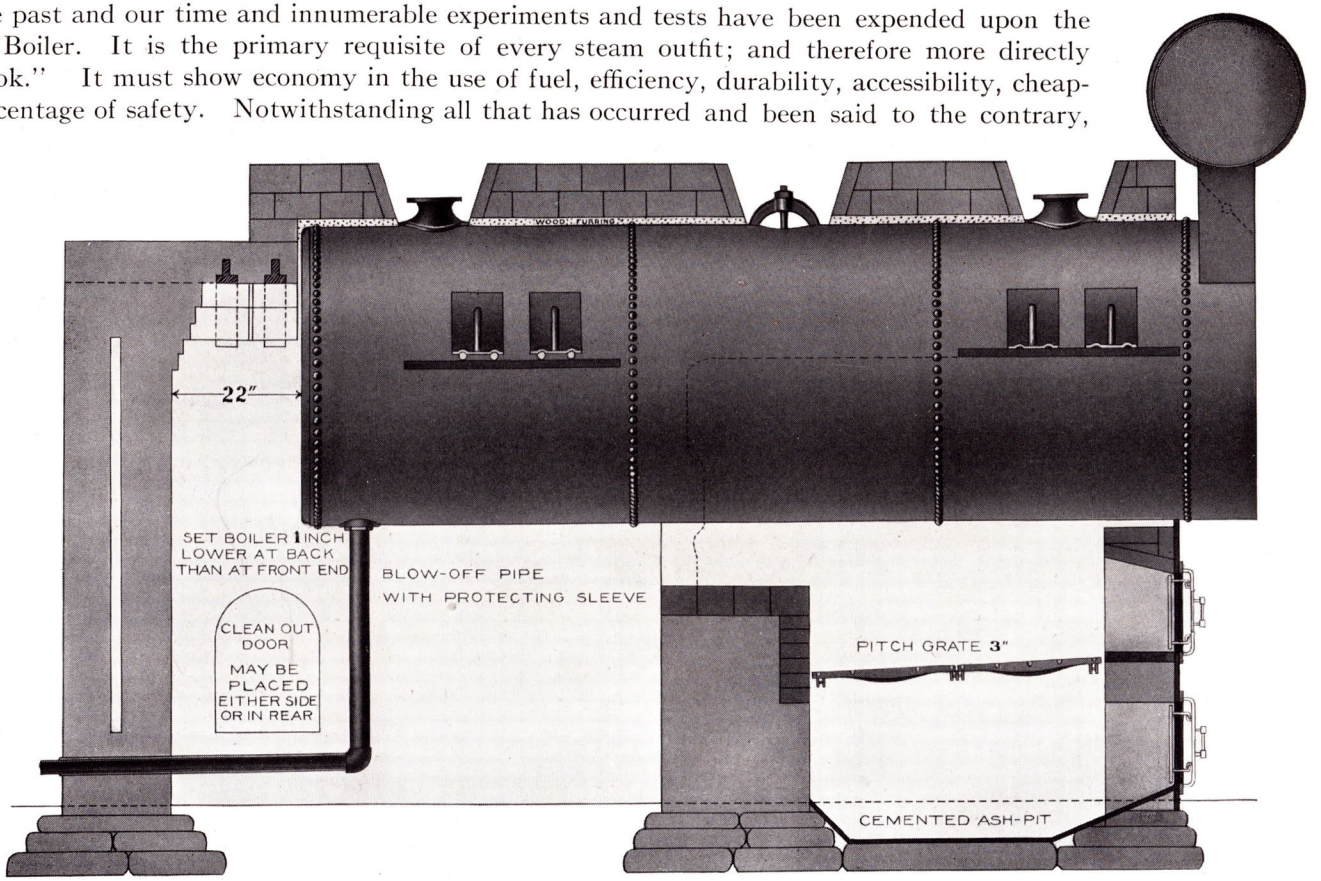
STEWART BOILER WORKS.

JAMES C. STEWART
JOHN C. STEWART
CHARLES M. STEWART

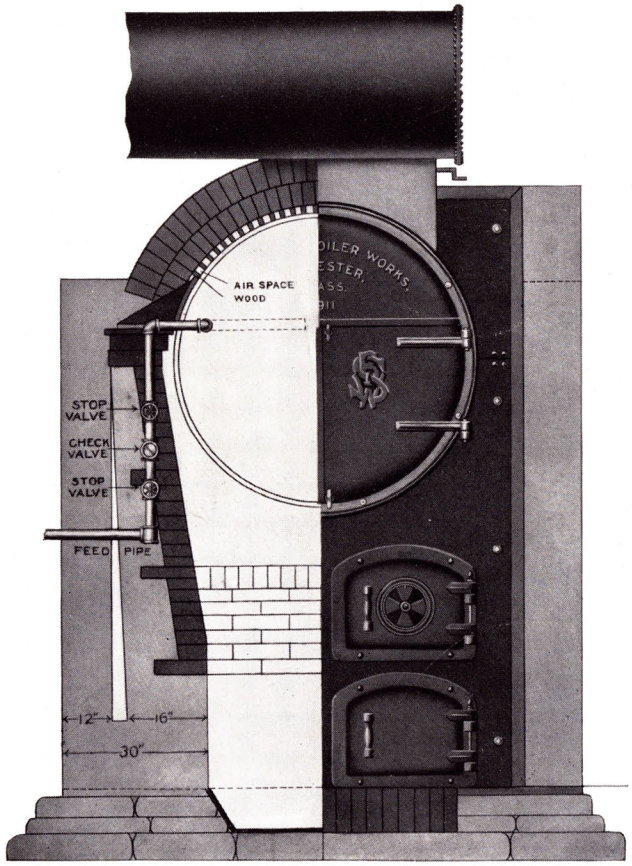
The Horizontal Tubular Boiler

THE best thought of the past and our time and innumerable experiments and tests have been expended upon the question of a Steam Boiler. It is the primary requisite of every steam outfit; and therefore more directly affects the "pocket-book." It must show economy in the use of fuel, efficiency, durability, accessibility, cheapness of repairs and a high percentage of safety. Notwithstanding all that has occurred and been said to the contrary, the Horizontal Tubular Boiler combines all of the above attributes for exacting duties, *when* made of the proper materials in best proportion and workmanship, set in brick work in a substantial manner, and operated intelligently.

Engineers and Firemen of experience who have had the care of different types of Boilers are pronounced in its favor. It is a significant fact that all of the general Boiler Makers of the United States make and recommend the Horizontal Tubular Boiler and that, too, at a sacrifice to themselves because of the keen competition, as contrasted with possibilities of other types.



The Steam Boiler Inspection and Insurance Companies after experiences with all other kinds and conditions have come to the same conclusion.



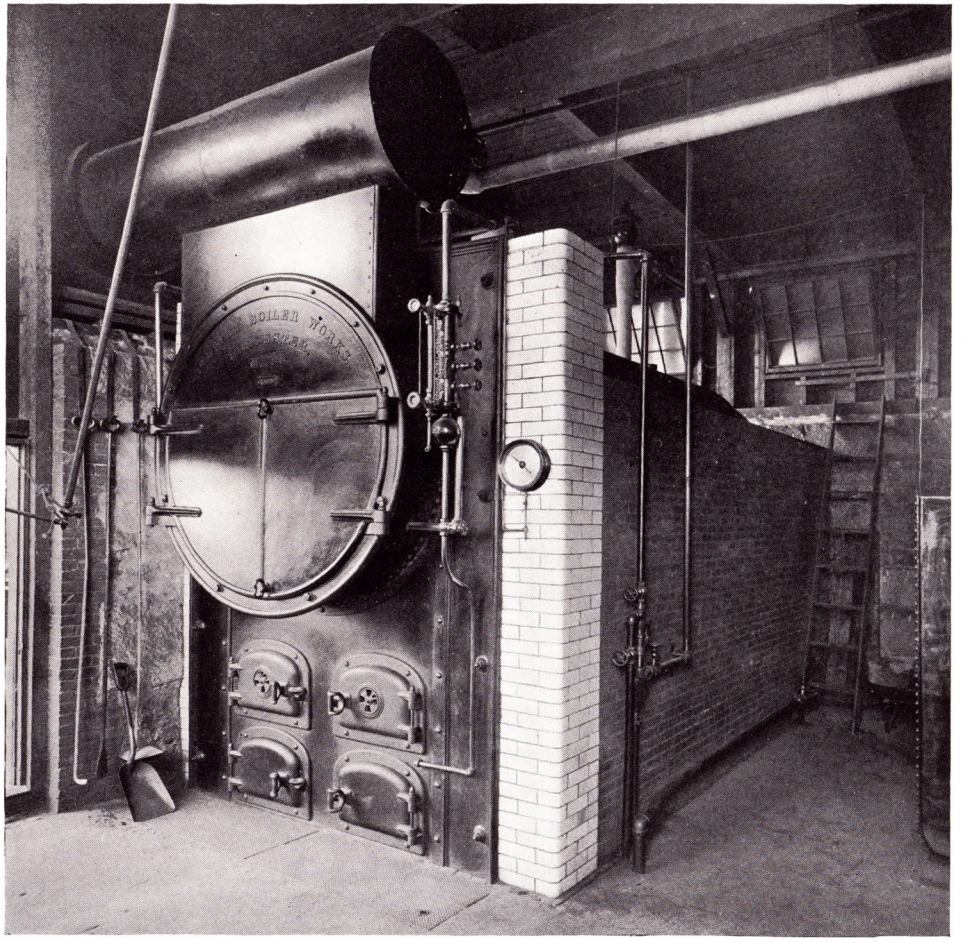
They also know which is the "safest type" from a financial point of view.

By permission we copy the following from "The Locomotive," published by the Hartford Steam Boiler Inspection and Insurance Company, April, 1898. They also print the cuts of and lay stress upon the proper *setting* of the Boiler.

"The essentials of a good Steam Boiler may be enumerated somewhat as follows:

"The heating surface must be ample and must be so arranged as to promote a free and rapid circulation of water and absorb the greatest possible amount of heat; the steam room and the evaporative surface must be large, so as to allow of an easy release of the steam from the water and afford a steady supply of uniformly dry quality; all parts of the Boiler should be as accessible as possible for examination, repairs and cleaning; the structure should expand as uniformly as possible, so that there shall be no severe strains produced when the temperature of the boiler varies from any cause; the boiler should be durable and possess an excess of strength, when new, in order to provide for wear and other deteriorating influence; it should not be liable to expensive repairs and its first cost should be as low as is consistent with the other requisites already mentioned. The horizontal tubular boiler has been considered to conform very closely to these requirements and for this reason it came into very general use. It is unfortunately true that the best methods have not always prevailed, either in the design or in the erection of this type of Boiler but this is no fault of the type itself."

The remainder of the article deals with proper construction, erection and feeding. Also an able exposure of the common fallacy regarding *thick* plates for Boilers.



In the manufacture of Boilers in our Works everything is open and free to the inspection of possible purchasers, the public and the qualified Inspectors. Our aim is to keep in the front rank with the best by using the best tools, most approved methods and skilled workmanship.

A Steam Boiler should be constructed of the best materials, the purchasers of the same should consider the "value received" and not, as is often the case, the one for the least first cost, with perhaps only a few dollars in its favor.

View of Horizontal Tubular Boiler, 72″ diameter, 17′ 6″ long, constructed for 125 lbs. steam pressure. Showing "Overhang" and Steel Plate Front, Uptake and Smoke Pipe to the Chimney on the left side. The front walls are faced with white Enameled Bricks.

Horizontal Tubular Boilers

WE state on the following pages, with some details, the sizes of Boilers usually made by us, many of which are carried in stock and process of manufacture. They are constructed to conform to the requirements of the Mass. Board of Boiler Rules and Specifications of the Steam Boiler Insurance and Inspection Companies in every respect, and as well as other Rules and Codes of States and Societies.

All Boilers are inspected and tested by an authorized Inspector and a Certificate of such Test and policy of insurance in the sum of $400.00 for each Boiler is given to the purchaser. *We will make any size of Boiler that may be desired, if permitted by the Rules governing construction.*

The nominal Horse-power given in the first column is guaranteed under the A. S. M. E. standard, which is the evaporation of 30 lbs. of water (nearly 4 gallons) per hour with a temperature of 100 degrees Fahr. and the steam gauge at 70 lbs. pressure or 34½ lbs. of water evaporated per hour from a feed water temperature of 212 degrees Fahr. into steam at atmospheric pressure. This result is easily accomplished with a chimney of suitable size and having ample connections. By increasing the pressure of Steam the "Engine" power of the Boiler is greater than the nominal. Of course, it is understood that first-class fuel, intelligent firing and good care are necessary for best results.

Order a Boiler of capacity beyond your present requirements because it is economical to install as large a unit as is consistent with the conditions.

The grate area can be reduced easily if necessary and all the benefits derived from better combustion, less attendance and by using a cheaper grade of fuel if desired. The steam pressure, or supply is also more steadily maintained. It is almost impossible to find a case where the Steam Boiler is too large, while on the other hand many are found where the Boiler is too small, or being worked without economy and far beyond good efficiency.

Standard Sizes of Horizontal Tubular Boilers for Massachusetts Requirements

Horse Power at 12 Square Feet	Horse Power at 15 Square Feet	Square Feet of Heating Surface	SHELL			HEADS	TUBES			GRATES		BRICK WORK				Height to Water Line from Floor	Height to Top of Boiler from Floor	Shipping Weight of Boiler and Fittings	Cubic Feet of Air Space will Heat	Steam Pressure Allowed
			Diameter	Length	Thickness	Thickness	Number	Diameter	Length	Length	Width	Thickness of Walls	Length Over All	Width	Height					
			Inches	Ft. In.	Inches	Inches		Inches	Ft. In.	Ft. In.	Ft. In.	Inches	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Lbs.		Lbs.
9	7	106	30	6—0	1/4	3/8	26	2 1/2	5—0	2—0	2—0	14	8—10	4—11	6—1	4—10	5—6	2,500	25,000	100
12	10	146	30	8—0	1/4	3/8	26	2 1/2	7—0	2—0	2—0	14	10—10	4—11	6—1	4—10	5—6	2,750	35,000	100
13	11	163	36	7—0	1/4	3/8	34	2 1/2	6—0	2—6	2—6	14	9—10	5—5	7—0	5—6	6—4	3,350	44,000	120
16	13	190	36	8—0	1/4	3/8	34	2 1/2	7—0	2—6	2—6	14	10—10	5—5	7—0	5—6	6—4	3,550	52,000	120
20	16	245	36	10—0	1/4	3/8	34	2 1/2	9—0	3—0	2—6	14	12—10	5—5	7—0	5—6	6—4	4,000	64,000	120
26	21	320	36	12—0	1/4	3/8	30	3	11—0	3—6	2—6	14	14—10	5—5	7—0	5—6	6—4	4,800	80,000	120
31	25	382	42	12—0	5/16	3/8	36	3	11—0	3—6	3—0	14	14—10	5—11	8—0	6—3	7—3	6,800	100,000	130
34	28	417	42	13—0	5/16	3/8	36	3	12—0	3—6	3—0	14	15—10	5—11	8—0	6—3	7—3	7,100	112,000	130
37	30	452	42	14—0	5/16	3/8	36	3	13—0	3—6	3—0	14	16—10	5—11	8—0	6—3	7—3	7,400	120,000	130
40	32	487	42	15—0	5/16	3/8	36	3	14—0	3—6	3—0	14	17—10	5—11	8—0	6—3	7—3	7,700	128,000	130
46	37	561	48	13—2	3/8	7/16	50	3	12—0	4—0	3—6	18	15—4	7—1	8—6	6—10	7—11	9,250	148,000	140
50	40	608	48	14—2	5/16	7/16	50	3	13—0	4—0	3—6	18	16—4	7—1	8—6	6—10	7—11	9,200	160,000	115
55	44	655	48	15—2	3/8	7/16	50	3	14—0	4—0	3—6	18	17—4	7—1	8—6	6—10	7—11	10,100	176,000	140
58	47	701	48	16—2	5/16	7/16	50	3	15—0	4—0	3—6	18	18—4	7—1	8—6	6—10	7—11	10,100	188,000	115
58	47	701	48	16—2	3/8	7/16	50	3	15—0	4—0	3—6	18	18—4	7—1	8—6	6—10	7—11	10,550	188,000	140
60	48	720	54	14—2	3/8	7/16	60	3	13—0	4—6	4—3	18	16—4	7—7	9—4	7—2	8—7	11,250	192,000	125
64	52	777	54	15—2	3/8	7/16	60	3	14—0	4—6	4—3	18	17—4	7—7	9—4	7—2	8—7	11,750	208,000	125
69	55	832	54	16—2	3/8	7/16	60	3	15—0	4—6	4—3	18	18—4	7—7	9—4	7—2	8—7	12,250	220,000	125
74	60	888	54	17—2	3/8	7/16	60	3	16—0	4—6	4—3	18	19—4	7—7	9—4	7—2	8—7	12,750	240,000	125
87	70	1,043	60	16—4	3/8	1/2	76	3	15—0	5—0	4—6	22	18—8	8—9	10—1	8—0	9—4	14,900	280,000	120
92	75	1,112	60	17—4	3/8	1/2	76	3	16—0	5—0	4—6	22	19—8	8—9	10—1	8—0	9—4	15,550	300,000	120

Boilers are made heavier when required for higher working pressures than stated, or for longer service against corrosion.
Boilers are made longer, or shorter, if desired. (Intermediate sizes not given for lack of space in a Table.)
Boilers 60" diameter and larger for use in Massachusetts have a *Manhole* in the front head below the Tubes.

Standard Sizes of Horizontal Tubular Boilers for Massachusetts Requirements

Horse Power at 12 Square Feet	Square Feet of Heating Surface	SHELL			HEADS	TUBES			GRATES		BRICKWORK				Height to Water Line from Floor	Height to Top of Boiler from Floor	Shipping Weight of Boiler and Fittings	Steam Pressure Allowed
		Diameter	Length	Thickness	Thickness	Number	Diameter	Length	Length	Width	Thickness of Walls	Length Over All	Width	Height				
		Inches	Ft. In.	Inches	Inches		Inches	Ft. In.	Ft. In.	Ft. In.	Inches	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Lbs.	Lbs.
92	1,111	60	17—4	7/16	1/2	76	3	16—0	5—0	4—6	22	19—8	8—9	10—1	8—0	9—4	17,200	135
104	1,250	60	19—4	7/16	1/2	76	3	18—0	5—0	4—6	22	21—8	8—9	10—1	8—0	9—4	18,500	135
104	1,257	66	17—5	7/16	1/2	76	3 1/2	16—0	5—6	5—0	27	20—1	10—1	10—7	8—5	9—10	20,300	125
117	1,413	66	19—5	7/16	1/2	76	3 1/2	18—0	5—6	5—0	27	22—1	10—1	10—7	8—5	9—10	21,900	125
104	1,257	66	17—5	1/2	1/2	76	3 1/2	16—0	5—6	5—0	27	20—1	10—1	10—7	8—5	9—10	21,000	140
117	1,413	66	19—5	1/2	1/2	76	3 1/2	18—0	5—6	5—0	27	22—1	10—1	10—7	8—5	9—10	22,800	140
127	1,533	72	17—6	7/16	1/2	94	3 1/2	16—0	6—0	5—6	27	20—1	10—7	11—5	9—1	10—8	24,000	125
143	1,724	72	19—6	7/16	1/2	94	3 1/2	18—0	6—0	5—6	27	22—1	10—7	11—5	9—1	10—8	26,500	125
143	1,724	72	19—6	17/32	9/16	94	3 1/2	18—0	6—0	5—6	27	22—1	10—7	11—5	9—1	10—8	27,800	150
159	1,916	72	21—6	17/32	9/16	94	3 1/2	20—0	6—0	5—6	27	24—1	10—7	11—5	9—1	10—8	29,500	150
170	2,034	78	19—7	9/16	5/8	112	3 1/2	18—0	6—6	6—0	27	22—3	11—1	12—1	9—7	11—4	34,300	145
188	2,260	78	21—7	9/16	5/8	112	3 1/2	20—0	6—6	6—0	27	24—3	11—1	12—1	9—7	11—4	36,600	145
203	2,442	84	19—9	9/16	5/8	136	3 1/2	18—0	7—0	6—6	27	22—3	11—7	12—7	10—0	11—10	38,200	135
226	2,714	84	21—9	9/16	5/8	136	3 1/2	20—0	7—0	6—6	27	24—3	11—7	12—7	10—0	11—10	40,500	135
203	2,442	84	19—9	5/8	5/8	136	3 1/2	18—0	7—0	6—6	27	22—3	11—7	12—7	10—0	11—10	39,300	150
226	2,714	84	21—9	5/8	5/8	136	3 1/2	20—0	7—0	6—6	27	24—3	11—7	12—7	10—0	11—10	42,000	150
237	2,848	90	19—9	5/8	5/8	160	3 1/2	18—0	7—6	7—0	27	22—3	12—1	13—1	10—4	12—4	44,500	140
263	3,165	90	21—9	5/8	5/8	160	3 1/2	20—0	7—6	7—0	27	24—3	12—1	13—1	10—4	12—4	48,000	140
279	3,358	96	19—9	5/8	5/8	190	3 1/2	18—0	8—0	7—6	27	22—3	12—7	13—7	10—9	12—10	50,000	130
311	3,732	96	21—9	5/8	5/8	190	3 1/2	20—0	8—0	7—6	27	24—3	12—7	13—7	10—9	12—10	53,300	130

Every Boiler has Butt-strap joints with double covering plates and the rivet holes are drilled. The Butt-straps are thinner than the "shell."
For each Boiler 48" diameter and larger the length of brick work given is for an "Overhanging" type of Front. The height of brick-work given includes nine (9") for a brick covering.
The number of Tubes stated allows room to place a *Manhole* in the front head, below the Tubes, as required by the Massachusetts Rules.

Specification

EVERY Boiler "Shell" is made of the best "Firebox" steel and each plate is tested, before using, to the Physical* Requirements of not less than 55,000 lbs. Tensile Strength, 56% reduction of area and 26% elongation in a section of 8 inches and the Chemical* Analysis required of Phosphorus not exceeding .04%, Sulphur not exceeding .04%, Manganese not exceeding .05%. The straight seams have Butt-strap Joints, double, triple or quadruple riveted according to the diameter of the boiler.

We use the Solid Pressed Steel Brace of great strength and, of course, without a weld. All other material used is of standard quality. Our Tools and workmanship are unexcelled.

We furnish with each Boiler the Fittings, so long established by custom and as specified by the Boiler Insurance Companies, as follows: One Fire "Front" with Anchor Rods, Fire-doors and linings, ash pit Doors, Dead-plate, "Door Arches" and Doors for access for cleaning the tubes. Set of plain Grates, Bearer Bars for grates, Cleanout door for brick-work, Rear Arch Bars, Bracket plates and Rollers, "Pop" safety Valve, Steam Gauge, Water Column with Water Gauge and glass and three Gauge-cocks.

On our 66″ and 72″ sizes we usually make the "Front" with a Steel Plate in the central parts bolted to cast-iron Panels. The Fire and ash Doors are set in frames which are bolted to the Steel Plate.

We also will furnish (without additional charge) a "Front" made entirely of Steel Plate.

With the 42″ diameter and larger Boilers we furnish "Mouth-pieces" made of firebrick material which is more durable than cast iron for heavy firing.

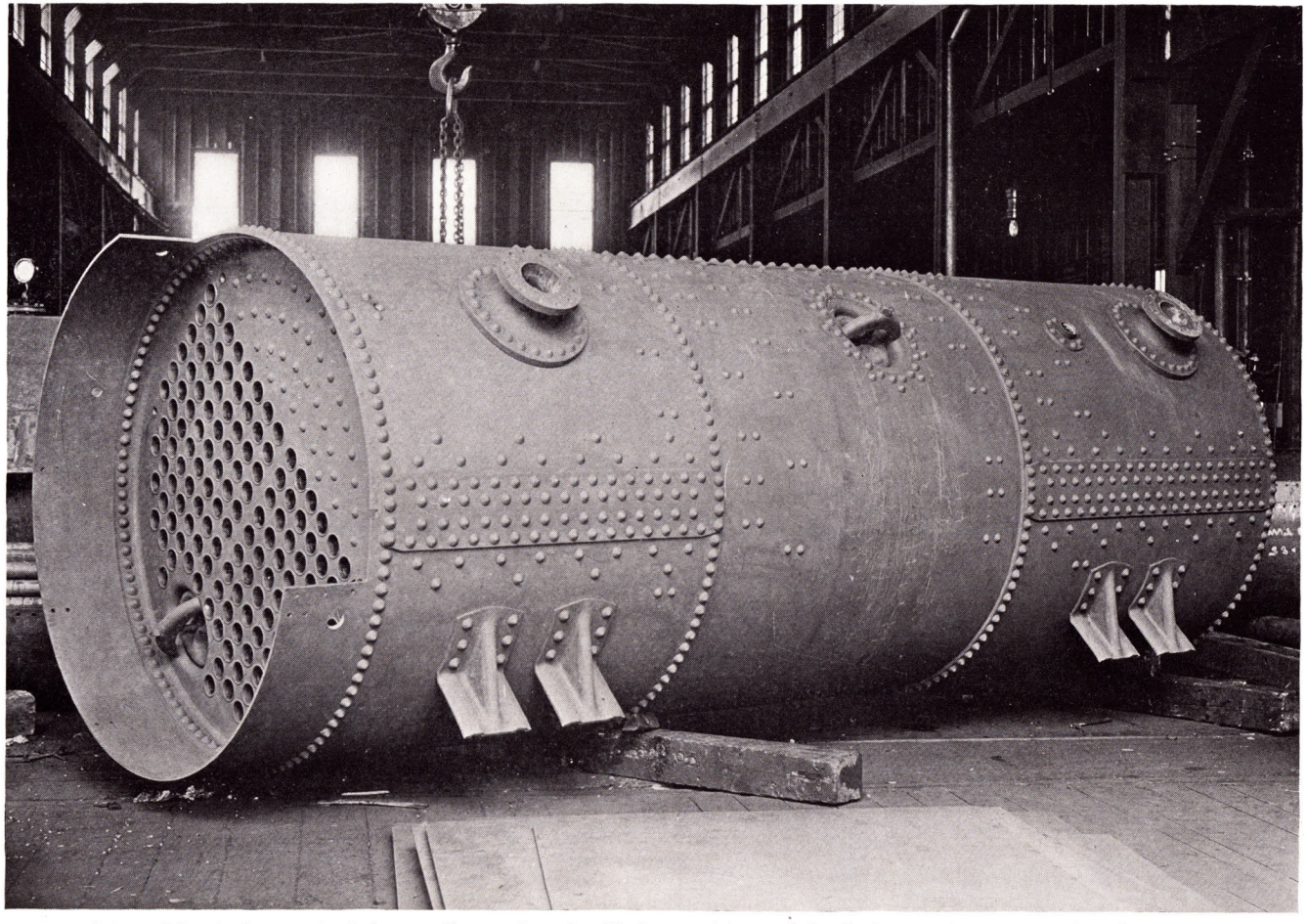
The lining for the Fire-door has projections cast on to slip into grooves made in the door, thus doing away with the old method of riveting same.

We have added other improvements and endeavor to maintain a high standard.

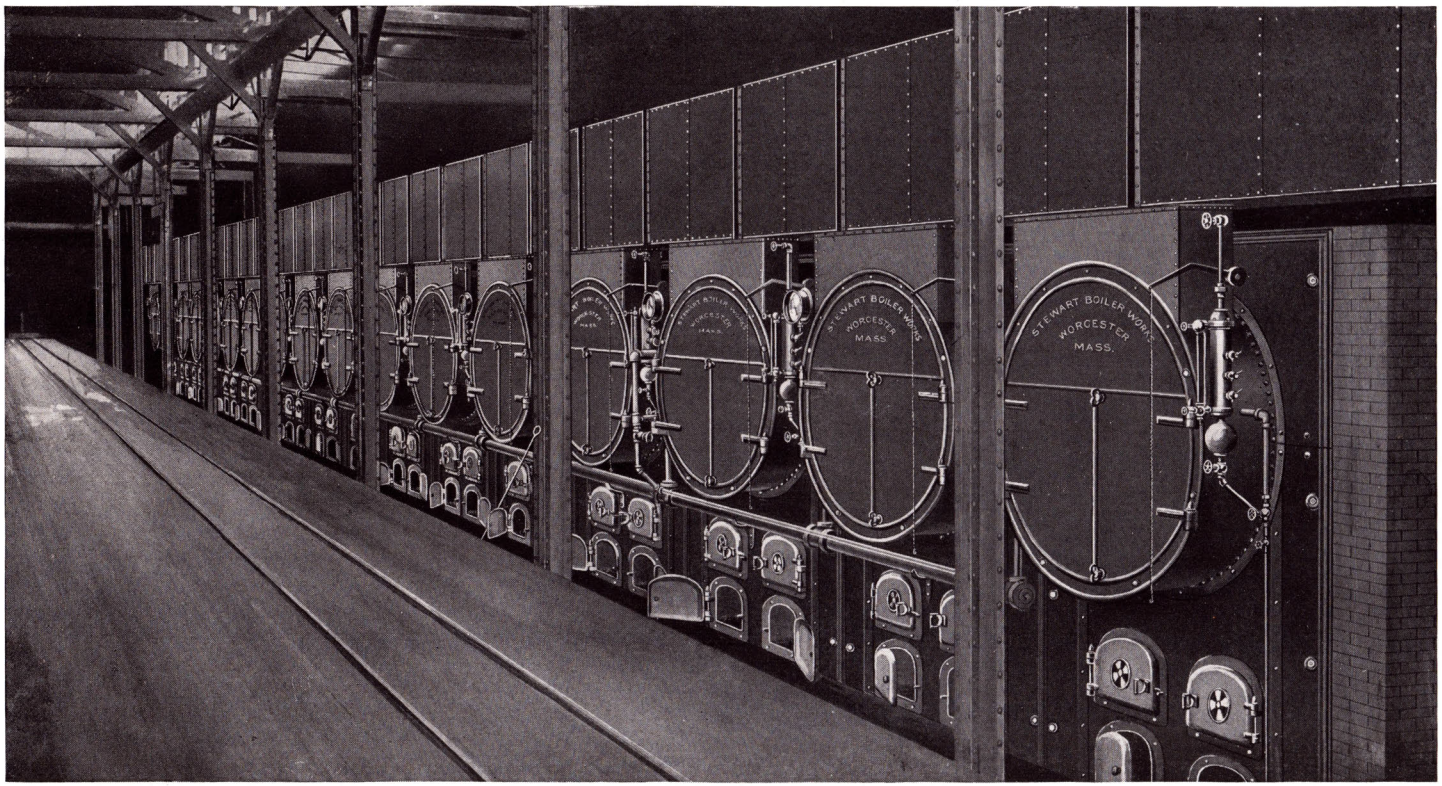
Massachusetts Standard Boilers over 78″ diameter, are supported, independent of the side walls, from steel lugs by the outside suspended type of setting. (See illustrations on pages 16 and 17.)

NOTE.—We have not included and do not advise Binder Bars, or "Buck Staves" (so-called), for the side walls of the Brick-work. Past experience and modern practice find them unnecessary. If desired, however, we will furnish them at an extra charge.

*The Physical and Chemical Requirements of Steel Plate are subject to changes made in Boiler Rules.



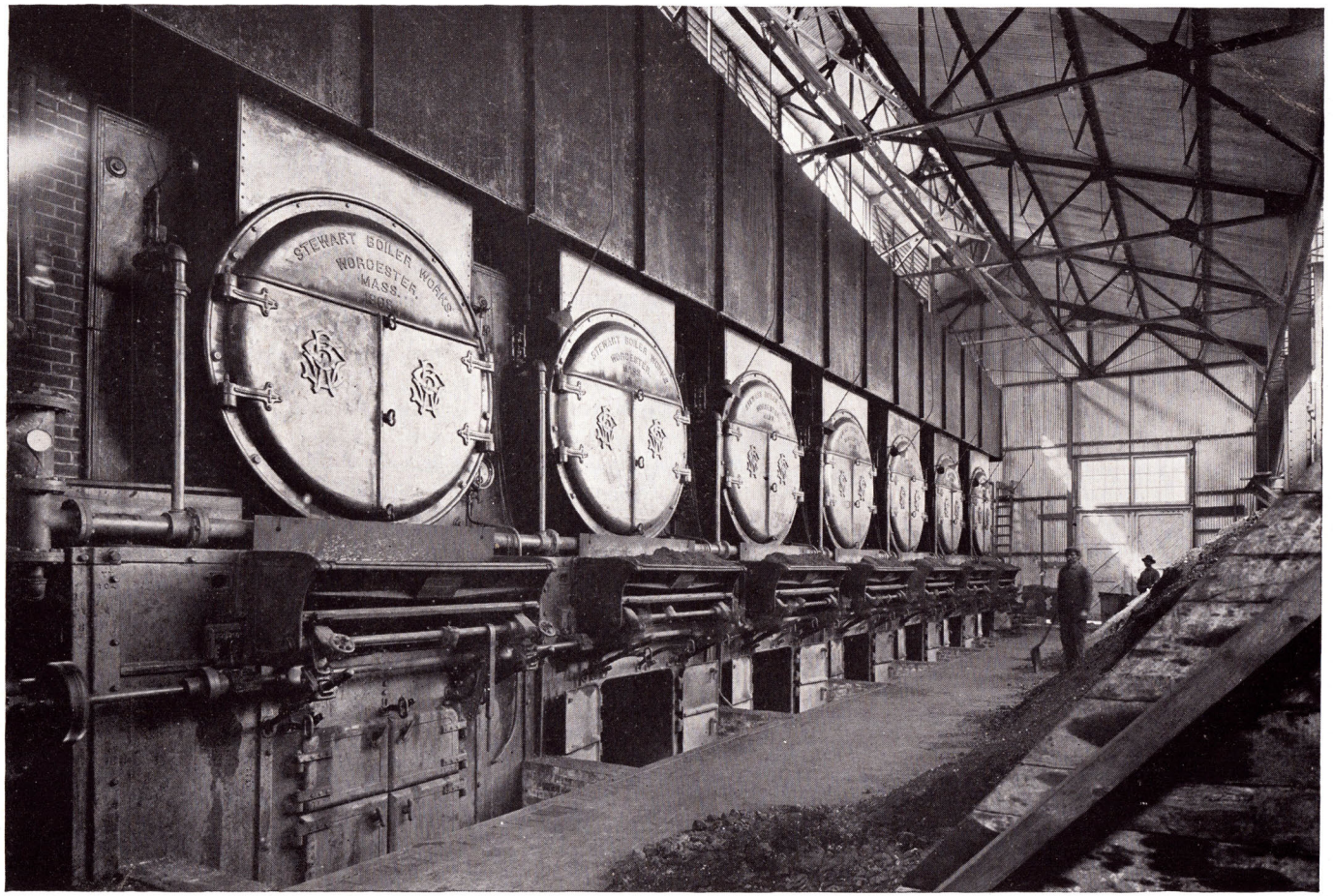
Boiler showing a Manhole pressed inwardly under the Tubes. Also a Manhole on the top made of pressed steel plate and double riveted to the Shell. Two forged steel Nozzles for steam outlets. Four pressed steel Brackets on each side. No cast iron riveted to Boiler.



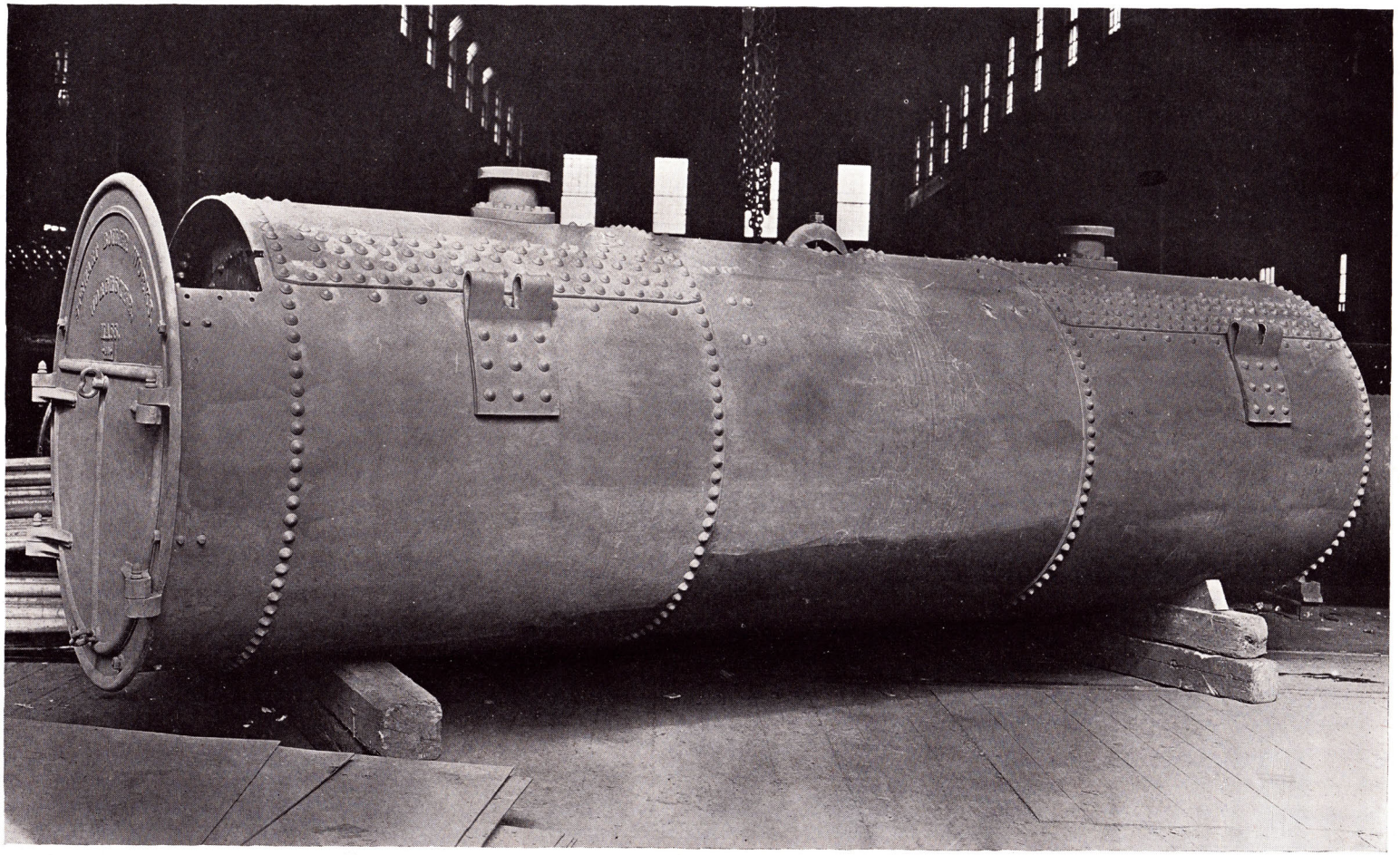
Seventeen Boilers 72″ diameter by 21′ 6″ long, showing "Overhanging" type of "Front" with the central portion made of best Boiler Steel Plate.

Constructed for a working pressure of 150 lbs. This battery is at the American Steel and Wire Co.'s Grove Street Works, Worcester, Mass.

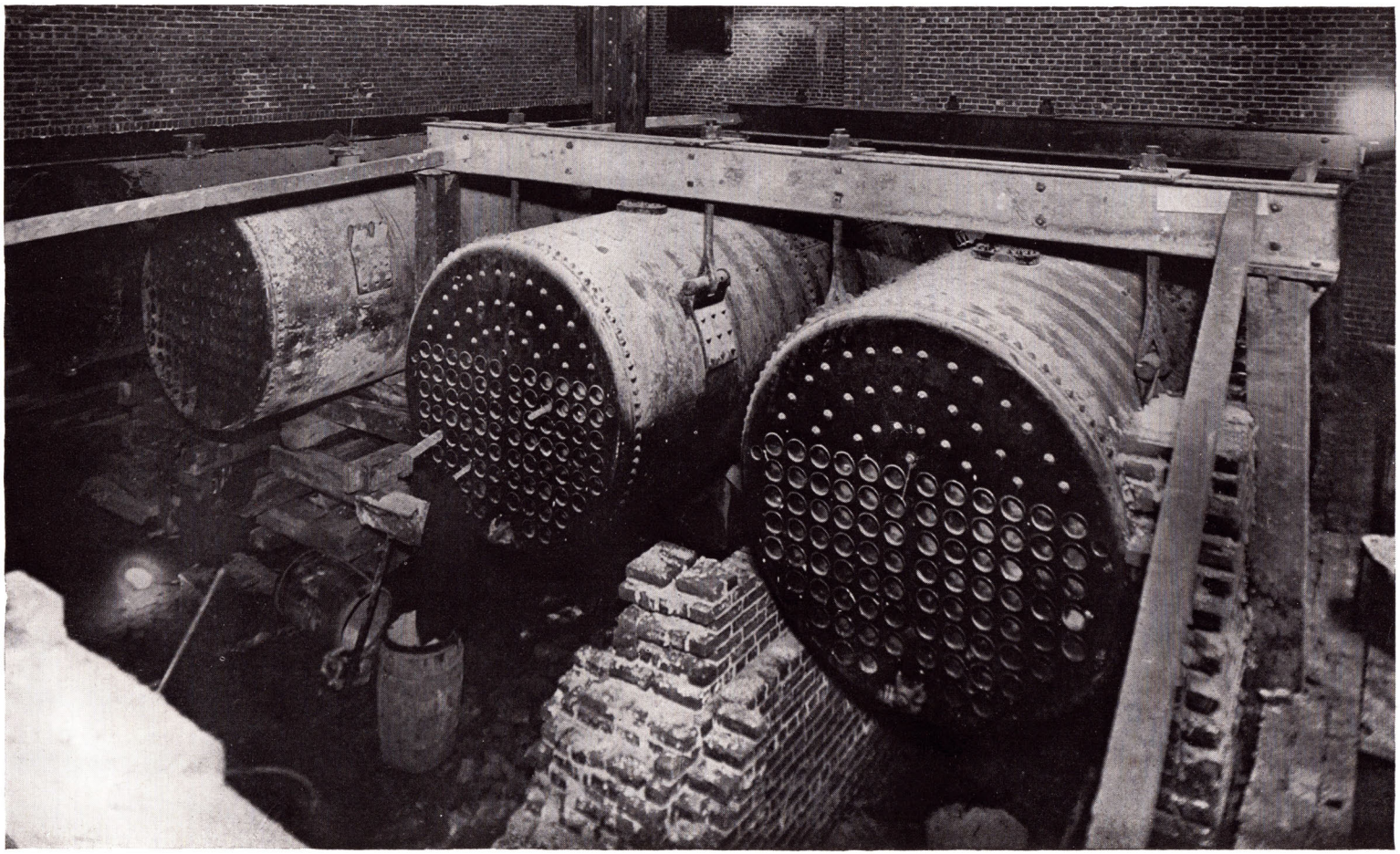
The Smoke Flue enters a Chimney 9′ 0″ diameter inside.



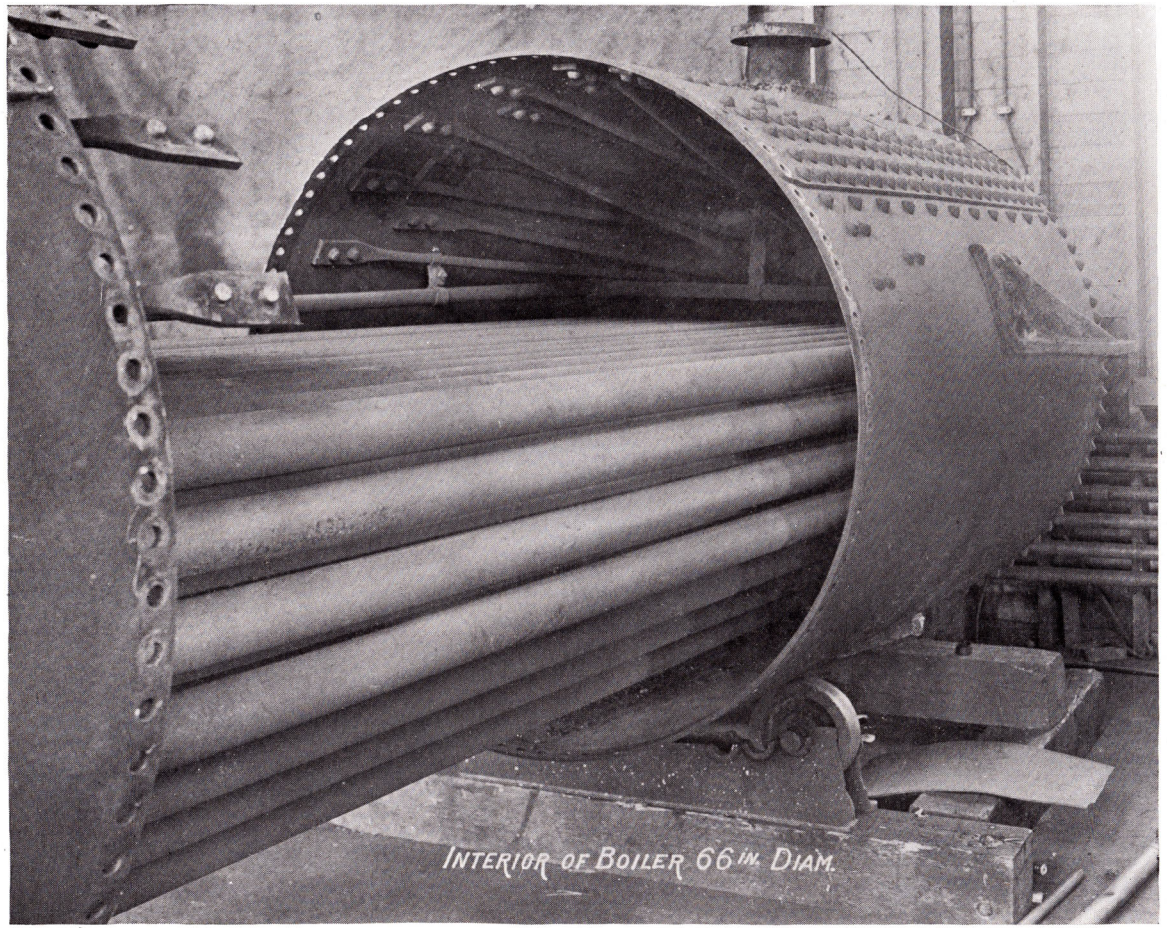
Seven Boilers 84″ diameter, equipped with Automatic Stokers.
Washburn Wire Co., Rolling Mill, Phillipsdale, R. I.



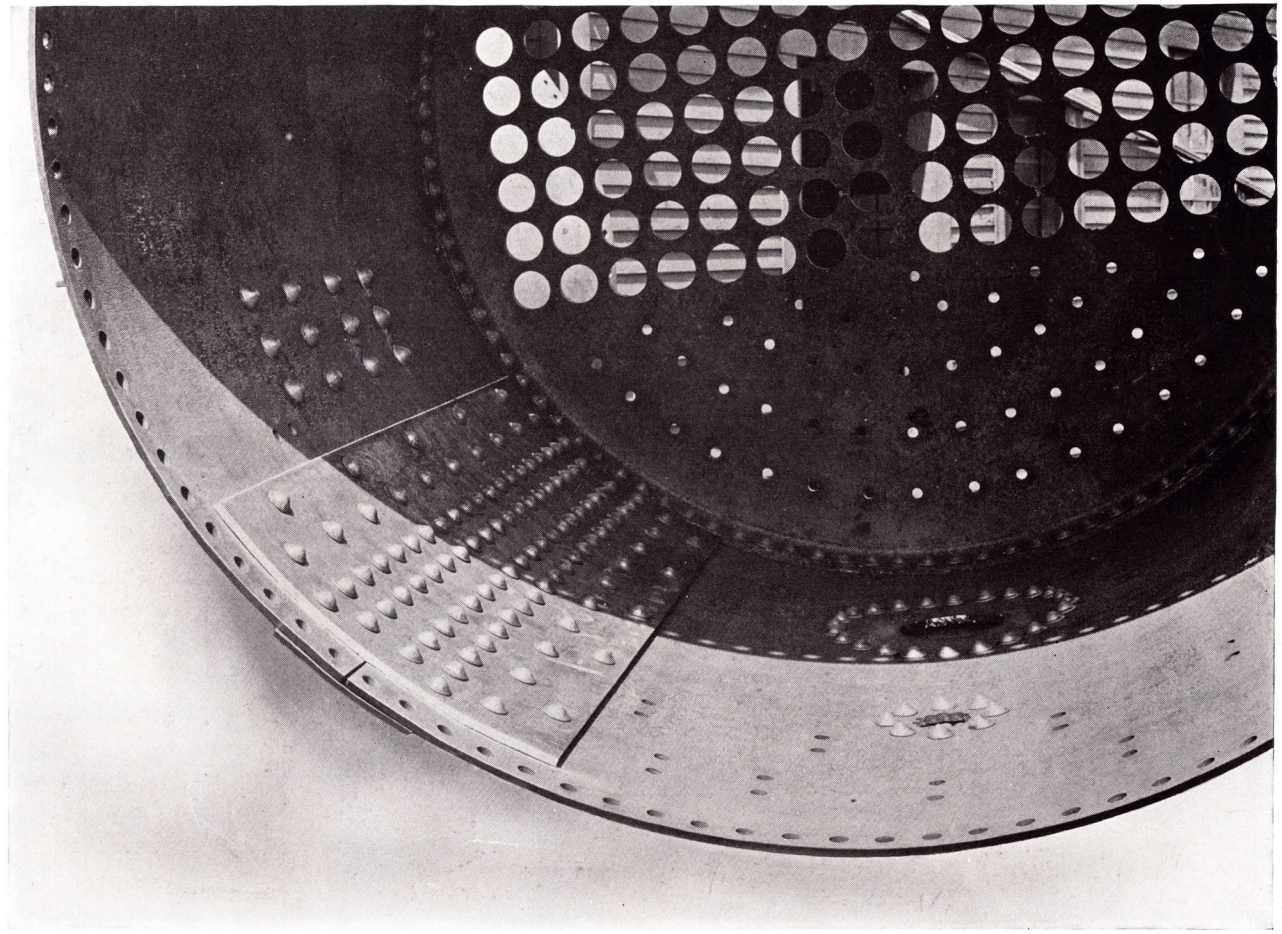
Mass. Standard Boilers larger than 78″ diameter require 2 "Hangers" on each side (made of Steel Plate) for Suspension Setting.



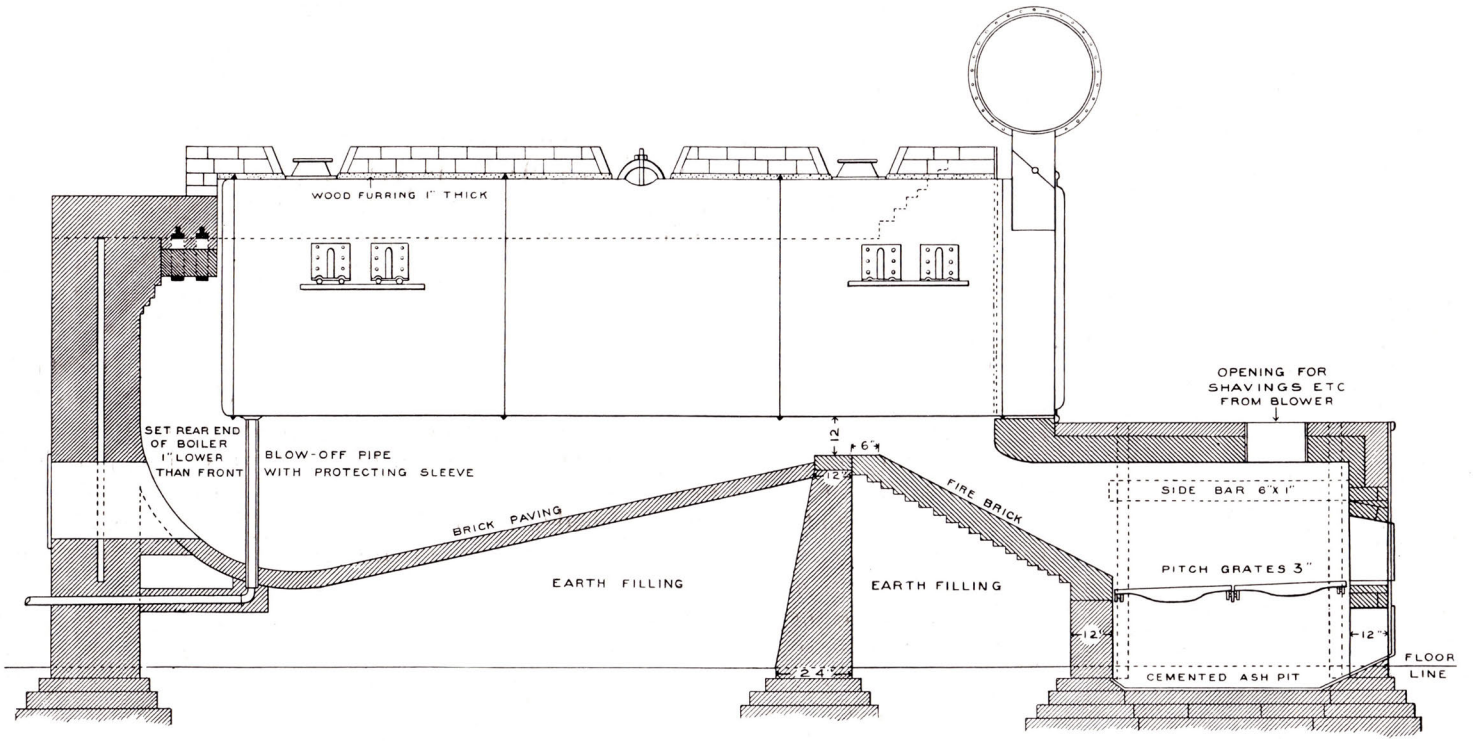
Rear view (by flashlight) of 4 Boilers being erected by the Suspension method of Setting.



Repair work, showing the Crowfoot Braces, Feed Pipe and Tubes before the new Plate was put on.



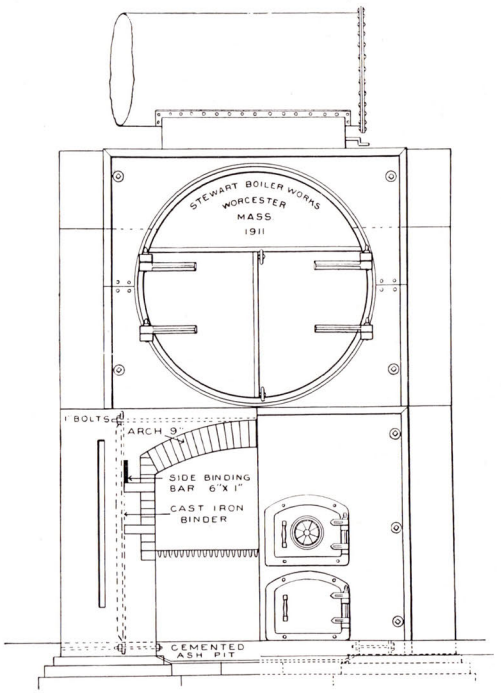
Interior view of a "Butt-strap joint" quadruple riveted (eight rows of Rivets, four rows on each side of the center of the inside strap or "butted" edges of the main plate). The narrow outside strap (edge showing underneath) has four rows of rivets.



Side Elevation of a Boiler equipped with an extension Furnace. ("Dutch Oven.")

Extension Furnace

("Dutch Oven")



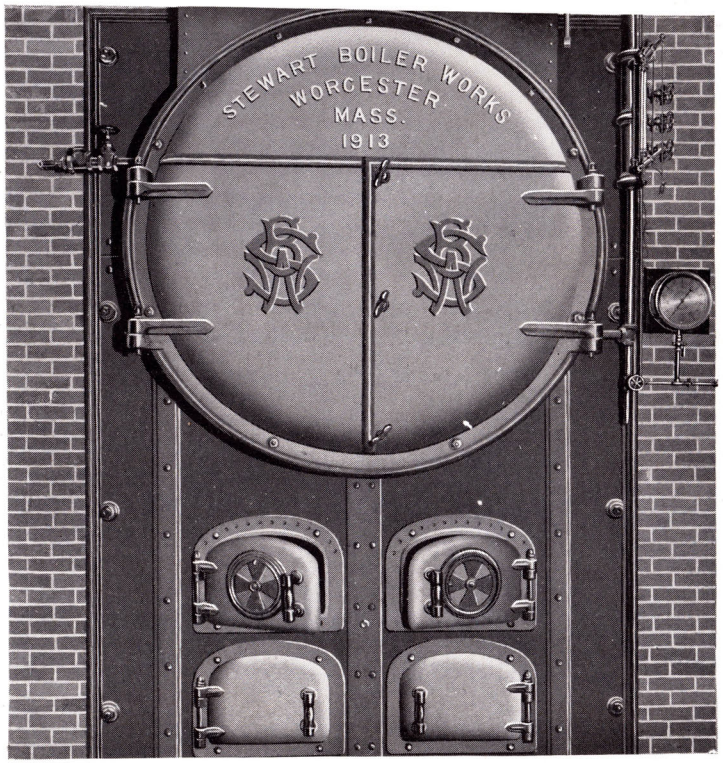
Front Elevation of an Extension Furnace. ("Dutch Oven.")

THE extension Furnace or Dutch Oven, so-called, applied to horizontal Tubular Boilers is used in some Wood-working establishments for the purpose of burning the refuse under the Boiler without losing the benefit of the *front* part of the heating surface of the bottom of the Boiler, which surface is directly over the space usually occupied by the Grates, Dead Plate and Door Arches.

The said heating surface is not efficient when green, or wet refuse wood is fed on Grates directly underneath, aided by a Blower, because proper combustion does not occur until after the Gases pass over the Bridgewall, where they are in contact with the warmer portion of the Brickwork. As artificial, or very strong natural draft is necessary for such Fuel, the extension Furnace has been devised with an Arch and a slightly restricted passage for, in order to cause more thorough mixture and complete combustion of, the Gases *before* they are impinged upon the Surface of the Boiler, thus making the entire heating surface of the bottom of the Boiler more efficient.

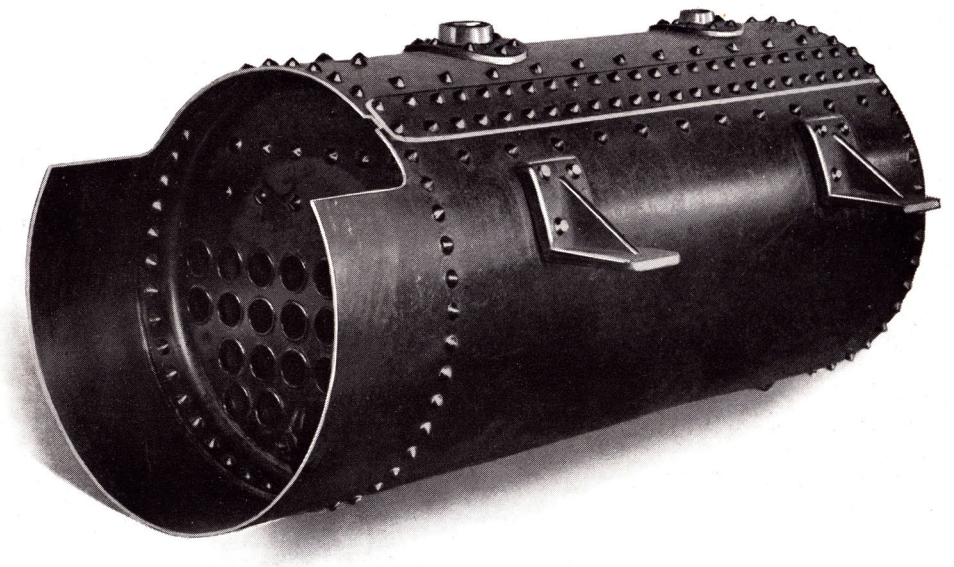
Wood fuel not having the same heat units as good Coal, of the same weight, it is necessary to burn more weight in proportion, in order to develop the amount of Steam required and the capacity of the Boiler, therefore the Grate area has to be enlarged correspondingly.

The extension Furnace has not been used extensively for burning good grades of Coal, yet the principle of making better combustion of the Gases should hold in the latter case, and *perhaps* may offset the first cost and disadvantages of more Brickwork to warm, loss by radiation and repairs.

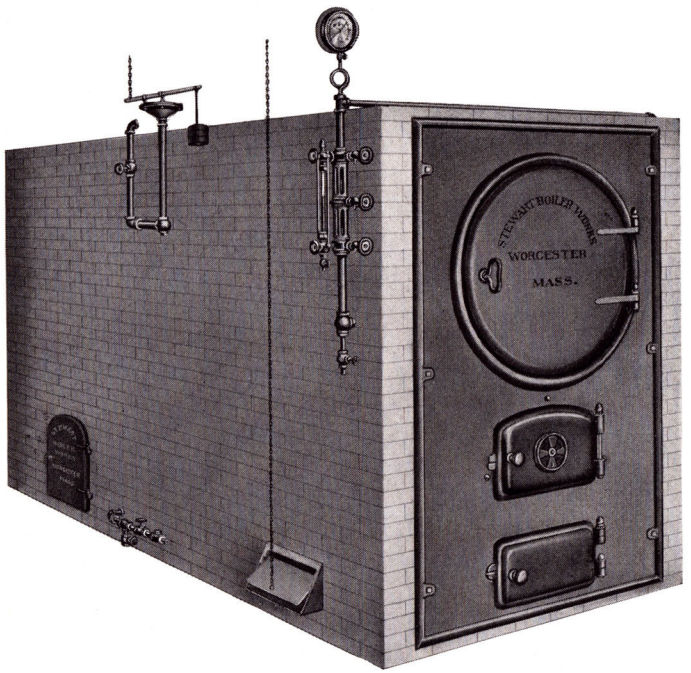


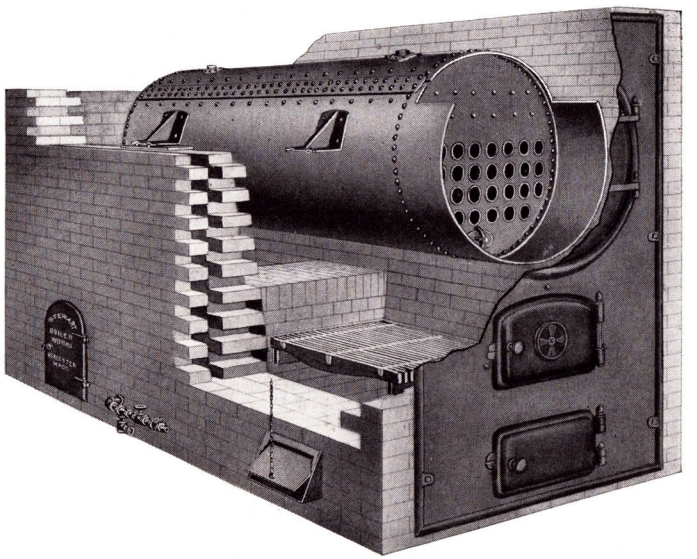
Overhanging "Front" for 72 inches diameter horizontal Boiler.

View of our so-called "Shaving Front" (72″ size) with one large opening (16 x 40) for firing with Shavings, Wood, Tan Bark and Refuse. For Boilers 36″ and 42″ diameter an opening 14 x 30.



Horizontal Tubular Boiler adapted for House-heating. Tested 150 lbs. cold water pressure.





Setting of the House Heating Boiler shown on the opposite page.

View shows Boiler equipped with automatic damper-regulator connected by chain to a butterfly air-door.

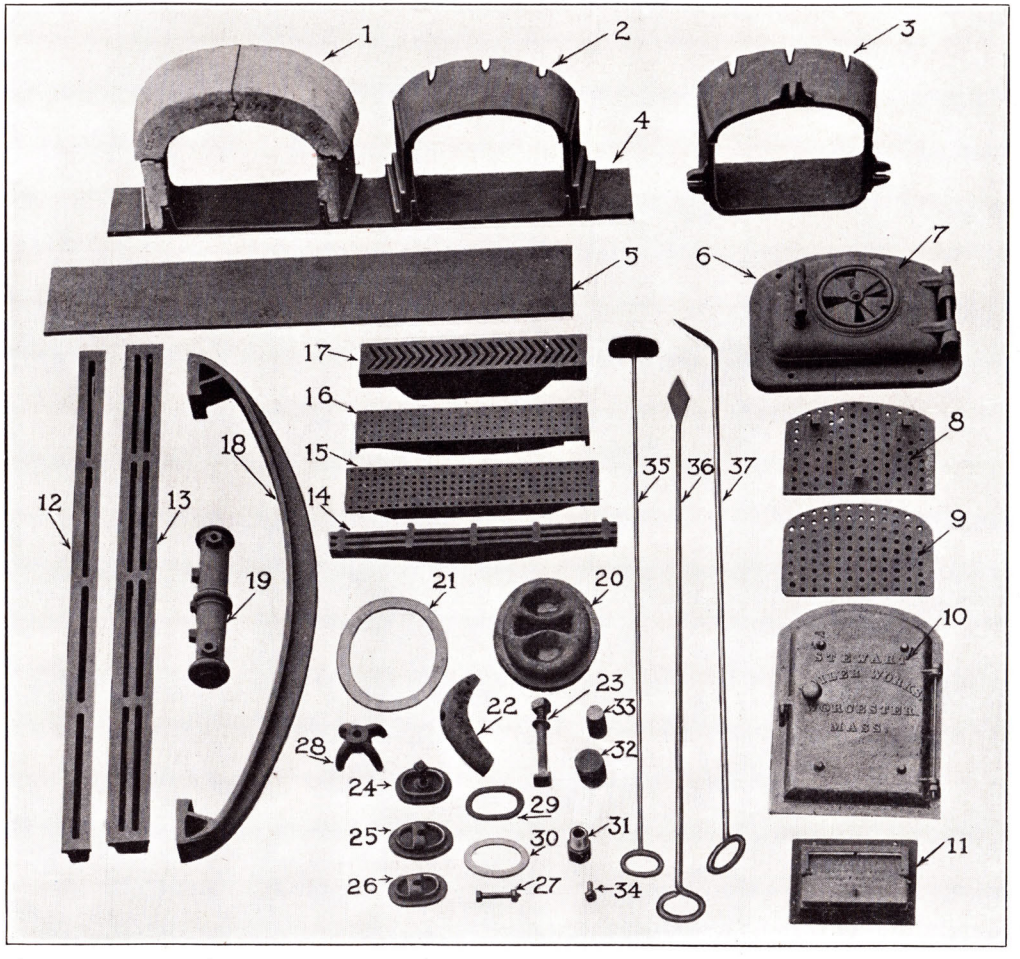
Also view of water column equipped with water glass and three-gage cocks. The "Front" shown is for 36″ diameter Boilers, having one fire door and one ash door.

Boilers 54″ diameter and larger have two fire doors and two ash doors.

Note that the side brick walls are constructed solid to the grate level, and above are built of separate walls with a 2″ air space to eliminate as far as possible, losses by radiation.

The Clean-out door at the side (rear) allows entry for cleaning, repairs and inspection.

The Grates shown are our three-bar pattern adapted for burning hard or soft coal, coke and wood.



List of Parts

No. 1. Door Arch of Firebrick

Sizes 14″ x 20″ x 12″ deep
16″ x 24″ x 12″ “
16″ x 40″ x 12″ “
14″ x 20″ x 15″ “

No. 2. Door Arch of Cast Iron

Sizes 12″ x 15″ x 12″ deep
14″ x 20″ x 12″ “
16″ x 24″ x 12″ “
16″ x 40″ x 12″ “
14″ x 20″ x 15″ “

No. 3. Door Arch of Cast Iron—Bolted Type

Sizes 12″ x 15″ x 12″ deep
14″ x 20″ x 12″ “
16″ x 40″ x 12″ “
13″ x 45″ x 12″ “
14″ x 20″ x 15″ “

No. 4. Dead Plate for Door Arches

Sizes 84″ x 12″
72″ x 12″
60″ x 12″
54″ x 12″
Sizes 48″ x 12″
72″ x 15″
60″ x 15″

No. 5. Dead Plate Plain for use with Lamprey Water Arches

Sizes 84″ x 12″
78″ x 12″
Sizes 72″ x 12″
60″ x 12″

Nos. 6 and 7. Cast Iron Door and Frame

Fire Door and Frame

Sizes 12″ x 15″ Right Only
14″ x 20″ Right and Left
16″ x 24″ “ “ “
16″ x 40″ “ “ “

Ash Pit Door and Frame

Sizes 14″ x 20″ Right and Left
16″ x 24″ " " "

Nos. 8 and 9. Door Linings

8. Hook Type

Sizes 14″ x 20″ Sizes 16″ x 24″
Sizes 16″ x 40″

9. Bolted Type

Sizes 12″ x 15″ Sizes 14″ x 20″

No. 10. Clean Out Door and Frame

Sizes 16″ x 24″ Sizes 12″ x 18″
Sizes 7″ x 10″

No. 11. Air Door

Sizes 8″ x 12″ Sizes 7″ x 7″

Nos. 12 and 13. Bearer Bars—2 Bars and 3 Bars

Sizes 7′—6″	Sizes 4′—6″
7′—0″	4′—0″
6′—6″	3′—6″
6′—0″	3′—0″
5′—8″	2′—6″
5′—2″	

No. 14. "3 Bar" Grate

Sizes 5′—0″	Sizes 3′—0″
4′—6″	2′—6″
4′—0″	2′—0″
3′—6″	1′—6″

No. 15. "Sawdust" Grate. $\frac{5}{8}$″ Holes

Sizes 3′—6″ Sizes 3′—0″
Sizes 2′—6″

No. 16. "Buckwheat" Grate. $\frac{5}{16}$″ Holes

Sizes 3′—6″ Sizes 3′—0″
Sizes 2′—6″

No. 17. "Herringbone" Grate

Sizes 5′—0″	Sizes 3′—3″
4′—6″	3′—0″
4′—0″	2′—6″
3′—6″	2′—0″

No. 18. Arch Back Bar

Sizes 84″	Sizes 54″
78″	48″
72″	42″
66″	36″
60″	

No. 19. Water Column

For 1″ pipe 18″ long
" 1¼″ " 24″ "

No. 20. Manhole Plate or Door

Size 11″ x 15″

No. 21. Manhole Gasket—Rubber, Asbestos or Lead

Size 11″ x 14½″

No. 22. Manhole Guard or Yoke

No. 23. Manhole Bolt, Nut and Washer

No. 24. Handhole Plate with Bolt Attached—Oval Shape

3″ x 4½″ now used for 30″ to 36″ diam. Boilers

No. 25. Handhole Plate with Loose Bolt—Elliptical Shape

4″ x 6″ now used for 54″ to 84″ diam. Boilers

No. 26. Handhole Plate with Loose Bolt—Oval Shape

3¼″ x 5¼″ now used for 42″ to 48″ diam. Boilers

No. 27. Handhole Bolt and Nut

No. 28. Handhole Guard or Yoke

No. 29. Handhole Gasket—Oval Shape

No. 30. Handhole Gasket—Elliptical Shape

No. 31. Brass Feed Bushing

For 1¼″ pipe For 1½″ pipe
For 2″ pipe

No. 32. Cast Iron Tube Plug

Sizes 2″, 2½″, 3″, 3½″

No. 33. Wooden Tube Plug

Sizes 2″, 2½″, 3″, 3½″

No. 34. Massachusetts Standard Fusible Plug

Sizes ½″, ¾″

Nos. 35, 36, 37. Firing Tools for Heating Boilers

35. Hoe
36. Slice Bar
37. Poker

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PRINTERS
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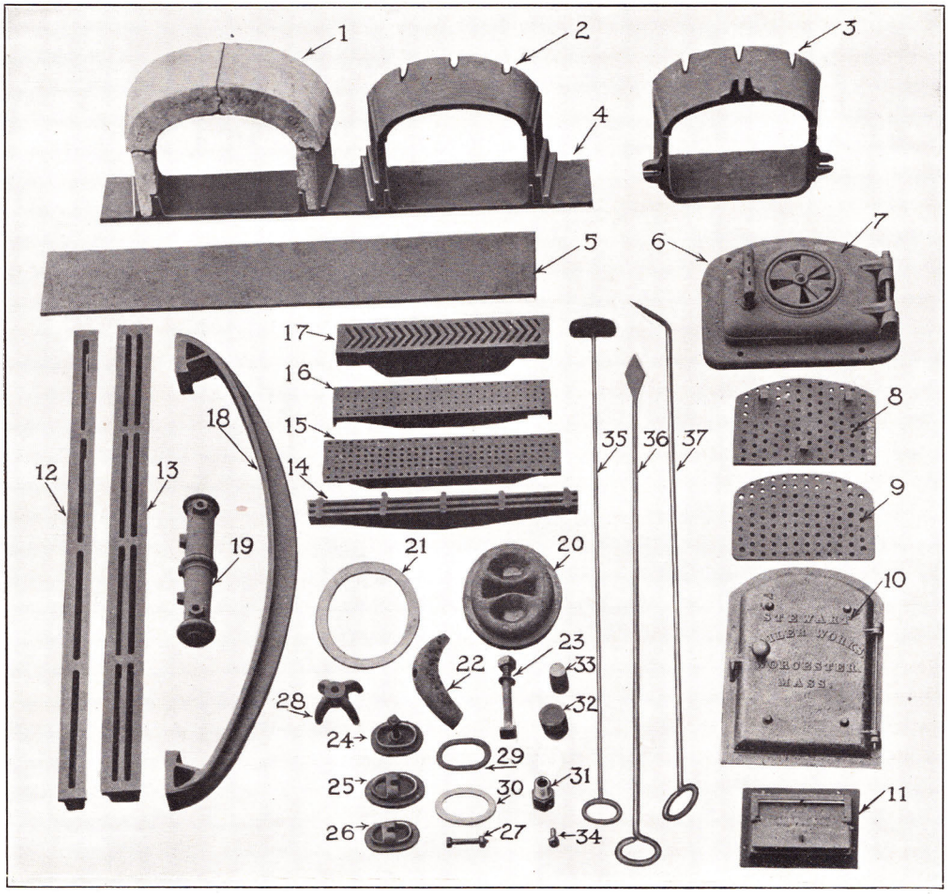
& BOSTON



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